

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, comprising:
a close wiring layer forming step of forming a plurality of wiring
layers in parallel and close to each other with a gap between neighboring
wiring layers on a base layer which is either a semiconductor layer or a
conducting layer;

an insulating layer depositing step of depositing an insulating layer
covering said wiring layer so as to bury said gap;

a contact hole opening step of opening two or more contact holes at
an interval in said insulating layer along the longitudinal direction of said
gap in a plan view;

a short-circuit preventing insulating film depositing step of
depositing a short-circuit preventing insulating film in said contact hole;

a short-circuit preventing film removing step of removing at least
said short-circuit preventing insulating film on the bottom of said contact
hole to expose said base layer; and

a plug interconnection forming step of forming a plug interconnection
in contact with said base layer by using a conductive material so as to bury
said contact hole.

2. The method of manufacturing a semiconductor device according
to claim 1, wherein said close wiring layer forming step includes a covering
insulating film forming step of forming a covering insulating film covering
each of wiring layers formed on said base layer and the base layer in said
gap.

3. The method of manufacturing a semiconductor device according
to claim 2, wherein in said contact hole opening step, a contact hole is
opened so as to reach the covering insulating film which covers said base
layer of the bottom of said gap formed in said covering insulating film
forming step.

4. The method of manufacturing a semiconductor device according to claim 2, wherein said contact hole opening step includes a covering insulating film removing step of removing the covering insulating film covering said base layer of the bottom of said gap to expose said base layer.

5. The method of manufacturing a semiconductor device according to claim 1, wherein in said short-circuit preventing insulating film depositing step, at least one of a silicon nitride film and a silicon oxide film is deposited by CVD.

6. The method of manufacturing a semiconductor device according to claim 1, wherein said plurality of wiring layers are a transfer gate as a word line, and said plug interconnection is a polypad which connects said base layer and a bit line.

7. A semiconductor device comprising:

a plurality of wiring layers disposed in parallel so as to be close to each other with a gap on a base layer which is either a semiconductor layer or a conductive layer;

an insulating layer disposed so as to bury said gap and cover said wiring layers; and

two or more plug interconnections made of a conductive material reaching said base layer, which are disposed at an interval in a part of said insulating layer along the longitudinal direction of said gap in a plan view,

wherein a short-circuit preventing insulating film different from said insulating layer is provided between said plug interconnection and said insulating layer.

8. The semiconductor device according to claim 7, wherein said short-circuit preventing insulating film enters a void occurring in a portion which buries said gap in said insulating layer.

9. The semiconductor device according to claim 7, wherein said

short-circuit preventing insulating film is at least one of a silicon nitride film and a silicon oxide film.

10. The semiconductor device according to claim 7, wherein said conductive material is polysilicon containing an impurity.

11. The semiconductor device according to claim 7, wherein said plurality of wiring layers are a transfer gate serving as a word line, and said plug interconnection is a polypad connecting said base layer and a bit line.